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SOFT MAPLE VOLUME TABLES FOR FURNITURE-TYPE, FLAT, 4/4-INCH DIMENSION FROM SMALL LOW-QUALITY TREES

ABSTRACT.--Volume tables are given for yield of clear-one-side, flat dimension from small low-quality trees and bolts removed in a stand improvement cut of 18- to 44-year-old soft maple trees in southern Illinois.

OXFORD: 526.6:176.1 *Acer rubrum*. KEY WORDS: bolter saw, bolts, flitches, cut-stock, thinnings.

Presented here are volume tables based on the yields of 4/4-inch-thick clear-one-side (C1S) grade furniture-type dimension cut from small low-quality soft maple *(Acer rubrum)*. These trees were removed in an improvement cut of an 18- to 44-year-old stand in southern Illinois and were therefore small and low quality.

All trees were cut off at a 6-inch top diameter inside bark (d.i.b.). The procedures used for sawing and cut-up were described previously.[1] Forty-two trees were bucked into 302 short bolts 2 to 6-1/2 feet long which were sawed into 1-1/8-inch-thick flitches on a portable bolter saw. None of the bolts had any faces clear. The flitches were kiln-dried to 8 percent moisture content and skip-dressed to 15/16-inch thickness.

The square-foot area of C1S dimension was measured by diagramming various size cuttings on each flitch. Cuttings 1 to 6 inches wide and 12 to 72 inches long were recorded for each flitch. About 61 percent of the volume of cuttings was in the 2- to 3-inch-width class. About 41 percent of the volume was made up of cuttings 24 inches and less, whereas 52 percent of the volume was made up of cuttings 36 to 60 inches long.

The tables show the maximum volumes recovered from low-quality material cut with a bolter saw. Losses due to further processing were estimated on a sample of flitches from 13 low grade bolts. The flitches were ripped into 2-1/4-inch-wide strips, and the strips finger-jointed and edge-glued into C1S panels. The trials showed that more wood is lost when ripping to a specific width and then crosscutting out the defects than when cutting random widths and lengths. Yield of 2-1/4-inch-wide strips was about 91 percent of the yield of random cut-up obtained by diagramming the same flitches. Crosscutting the defects from the 2-1/4-inch strips and then finger-jointing the ends reduced the yield further. The yield in panels made from the defect-free, finger-jointed strips was 74 percent of the diagrammed C1S yield. These trials illustrate how the volume tables presented here can provide a starting point in determining yields of products for a potentially higher value use for material from low-quality trees and bolts than for other roundwood products.

[1] *D. E. Dunmire, E. F. Landt and R. E. Bodkin. Logging residue is a source of valuable black walnut dimension. For. Prod. J. 22(1): 13-17, illus. 1972.*

Table 1.--*Bolt volumes for clear-one-side (C1S), flat, nominal 4/4-inch dimension soft maple*[1]
(In square feet)

Bolt d.i.b. small end (inches)	Bolt length (inches)																Number of bolts
	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80	
5	0.52	0.65	0.79	0.94	1.09	1.24	1.40	1.56	1.73	1.90	2.07	2.25	2.43	2.61	2.79	2.98	-
6	.84	1.06	1.29	1.52	1.77	2.02	2.28	2.54	2.81	3.09	3.37	3.65	3.94	4.24	4.54	4.84	76
7	1.27	1.60	1.94	2.30	2.66	3.04	3.43	3.83	4.24	4.65	5.07	5.51	5.94	6.39	6.84	7.30	75
8	1.81	2.28	2.77	3.27	3.80	4.34	4.89	5.46	6.04	6.64	7.24	7.85	8.48	9.11	9.76	10.41	57
9	2.47	3.12	3.78	4.48	5.20	5.94	6.70	7.47	8.27	9.08	9.90	10.75	11.60	12.47	13.35	14.24	37
10	3.28	4.12	5.01	5.93	6.88	7.86	8.86	9.89	10.94	12.02	13.11	14.22	15.35	16.50	17.67	18.85	20
11	4.22	5.31	6.46	7.64	8.87	10.13	11.42	12.75	14.10	15.48	16.89	18.33	19.79	21.27	22.77	24.29	16
12	5.32	6.70	8.14	9.63	11.17	12.76	14.40	16.07	17.78	19.52	21.29	23.10	24.94	26.81	28.70	30.62	14
13	6.58	8.29	10.07	11.92	13.83	15.79	17.81	19.88	21.99	24.15	26.35	28.59	30.86	33.17	35.51	37.89	5
14	8.02	10.09	12.26	14.51	16.84	19.24	21.70	24.21	26.79	29.42	32.09	34.82	37.59	40.40	43.25	46.15	2
15	9.64	12.13	14.73	17.44	20.23	23.11	26.07	29.09	32.19	35.34	38.56	41.83	45.16	48.54	51.97	55.44	-
Number of bolts	-	19	19	2	32	11	6	51	32	3	11	3	1	54	58	-	302

[1]Regression equation for C1S square feet=$0.000163 \times \text{Diameter}^{2.66086} \times \text{Length}^{1.262316}$ (based on all bolts). Standard error of estimate=1.957 square feet. $R^2=0.94$.

NOTE: Heavy black lines indicate distribution of data.

Table 2.--*Tree volumes for clear-one-side (C1S)*[1], *flat, nominal 4/4-inch dimension soft maple and dimension recovery factors (DRF)*[2]
(C1S volumes in square feet)

D.b.h. (inches)	Item	Tree height to a 6-inch d.i.b. top (feet)										Number of trees
		10	15	20	25	30	35	40	45	50	55	60	
6	C1S	4.30	6.54	8.80	11.08	13.38	15.68	18.00	20.33	22.67	25.02	27.37	-
	DRF	*2.70*	*2.88*	*3.02*	*3.13*	*3.23*	*3.31*	*3.38*	*3.45*	*3.51*	*3.57*	*3.62*	
7	C1S	5.94	9.03	12.15	15.30	18.48	21.67	24.87	28.09	31.32	34.56	37.80	1
	DRF	*2.82*	*3.01*	*3.15*	*3.27*	*3.37*	*3.46*	*3.53*	*3.60*	*3.66*	*3.72*	*3.78*	
8	C1S	7.86	11.95	16.08	20.25	24.44	28.66	32.90	37.16	41.43	45.72	50.01	3
	DRF	*2.92*	*3.12*	*3.27*	*3.39*	*3.50*	*3.59*	*3.67*	*3.74*	*3.80*	*3.86*	*3.92*	
9	C1S	10.06	15.29	20.58	25.92	31.29	36.69	42.11	47.56	53.03	58.52	64.02	12
	DRF	*3.02*	*3.23*	*3.38*	*3.51*	*3.61*	*3.71*	*3.79*	*3.86*	*3.93*	*3.99*	*4.05*	
10	C1S	12.54	19.07	25.67	32.32	39.02	45.75	52.52	59.31	66.13	72.98	79.84	7
	DRF	*3.11*	*3.32*	*3.48*	*3.61*	*3.72*	*3.82*	*3.90*	*3.98*	*4.05*	*4.11*	*4.17*	
11	C1S	15.32	23.29	31.34	39.47	47.65	55.87	64.13	72.43	80.76	89.11	97.49	3
	DRF	*3.19*	*3.41*	*3.58*	*3.71*	*3.82*	*3.92*	*4.01*	*4.08*	*4.15*	*4.22*	*4.28*	
12	C1S	18.38	27.94	37.61	47.36	57.18	67.05	76.96	86.92	96.91	106.94	116.99	7
	DRF	*3.27*	*3.50*	*3.66*	*3.80*	*3.92*	*4.02*	*4.10*	*4.18*	*4.26*	*4.32*	*4.39*	
13	C1S	21.74	33.05	44.48	56.01	67.62	79.29	91.02	102.79	114.61	126.47	138.36	6
	DRF	*3.34*	*3.57*	*3.75*	*3.89*	*4.00*	*4.11*	*4.20*	*4.28*	*4.35*	*4.42*	*4.48*	
14	C1S	25.39	38.60	51.96	65.43	78.98	92.62	106.31	120.07	133.87	147.72	161.61	2
	DRF	*3.41*	*3.65*	*3.82*	*3.97*	*4.09*	*4.19*	*4.28*	*4.37*	*4.44*	*4.51*	*4.58*	
15	C1S	29.34	44.61	60.04	75.61	91.27	107.03	122.85	138.75	154.70	170.70	186.76	1
	DRF	*3.48*	*3.72*	*3.90*	*4.04*	*4.17*	*4.27*	*4.37*	*4.45*	*4.53*	*4.60*	*4.67*	
Number of trees		1	1	2	6	8	7	12	1	4	-	-	42

[1]Regression equation for C1S flat dimension is $0.009326 \times \text{Dbh}^{2.09589} \times \text{Height}^{1.03289}$. Standard error of estimate is 9.222 square feet. $R^2=0.94$.

[2]Dimension recovery factor equals volume of C1S in square feet divided by total cubic feet in tree to a 6-inch d.i.b. top. Prediction equation for cubic feet equals $0.008293 \times \text{Dbh}^{1.81788} \times \text{Height}^{0.86923}$. Standard error of estimate is 1.627 cubic feet. $R^2=0.96$.

NOTE: Heavy black lines indicate distribution of data.

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